

**A REVIEW OF THE *METACHARIS SYLOES* GROUP (LEPIDOPTERA:
RIODINIDAE), WITH THE DESCRIPTION OF TWO NEW SPECIES FROM
WEST OF THE ANDES**

JASON P. W. HALL

Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560-0127, USA

Abstract.—On the basis of male genitalia and wing pattern, the Neotropical rioidinid genus *Metacharis* Butler is tentatively divided into four species groups, whose phylogenetic inter-relationships are briefly discussed. With this taxonomic framework established, the derived *syloes* group is here characterized and taxonomically elaborated. It contains one described species, *M. syloes* Hewitson, and two that are described here, *M. fergusi*, **n. sp.**, and *M. smalli*, **n. sp.** These are the only *Metacharis* species to exclusively inhabit montane forest, and they are distributed allopatrically in the eastern Andes, western Andes, and mountains of central and eastern Panama, respectively. The elevation of *M. umbrata* Stichel to species status (**n. stat.**) is also discussed.

Key Words: allopatry, Andes, Ecuador, *Metacharis*, montane forest, Panama

The Neotropical rioidinid genus *Metacharis* Butler (Riodiniinae: Riodinini) contains a minimum of eight described species that are distributed from Nicaragua to southeastern Brazil. As conceived by early authors (Bates 1868; Stichel 1910–11, 1930–31; Rebillard 1958; Bridges 1994; d’Abrera 1994), the genus was polyphyletic, and the misplaced *exigua* Bates, *elinas* Rebillard and *chia* Hübner were only recently transferred to *Symmachia* Hübner (Riodiniinae: Symmachiini) and *Carionothis* Stichel (Riodiniinae: Riodinini) (Callaghan 1995, Hall and Harvey 2002, Callaghan and Lamas, in press). As treated by Callaghan and Lamas (in press), *Metacharis* is a monophyletic group. Its species are characterized by having elongate wings that are shades of brown or iridescent blue with silver vein endings dorsally and four spots in the discal cells, male genitalia with a posteriorly elongate, simple (i.e. without a scobinate patch at the tip), “rod”-like ped-

icel and a spine-tipped outer upper valve process, and female genitalia with a hollow, posteriorly projecting, trapezoid-shaped ostium bursae and a ductus bursae that makes an asymmetrically displaced exit to the right (Hall 2001). *Dachetola* Hall has been suggested as the closest relative of *Metacharis* (Hall 2001).

Having examined the male genitalia of all *Metacharis* species, some preliminary phylogenetic conclusions can be drawn, which indicate that four main species groups can be recognized. Only *M. ptolomaeus* (Fabricius) (*agrius* Dalman is probably conspecific) and *M. lucius* (Fabricius) lack a long, narrow, lower valve process that parallels the “rod”-like pedicel, and, as their males have more wing pattern elements visible than those of their congeners, I hypothesize that these two species may be the most basal in the genus. Of the remaining species, *M. victrix* (Hewitson), *M. umbrata* Stichel (**n. stat.**, see Note on Status

of *Metacharis umbrata* at the end of the paper), and *M. xanthocraspedum* Stichel have setae at the tip of the inner upper valve process and a curved pedicel, as in the two putative basal species, and *M. regalis* Butler, *M. nigrella* Bates (*cuparina* Bates is probably conspecific), *M. syloes* Hewitson, and two undescribed species have stout spines at the tip of the inner upper valve process (like those on the outer upper valve process of all *Metacharis* species) and a horizontal pedicel that abruptly curves upward at the tip only. Of the last five species, the lowland Amazonian *M. regalis* and *M. nigrella* have sparsely distributed spines along the distal half of the outer upper valve process, whereas *M. syloes* and the two undescribed species, referred to here as the *syloes* group, have one or two, small, dense patches of spines on this valve process. *Metacharis syloes* group species are also unique within the genus in having males with plain brown wings dorsally, and in exclusively occurring in montane forest habitats. The widespread, east Andean *M. syloes* is the only described species of the group, and the two other group members, which occupy smaller allopatric ranges to the west of the Andes, are described here, as part of a review of the *syloes* group.

It is biogeographically and evolutionarily interesting that most *Metacharis* species appear to be allo- or parapatrically distributed with respect to the other members of their species group. In fact, all are if the distinctive *M. xanthocraspedum* is considered to be its own group. Perhaps noteworthy is the fact that all species in the possible sister genus, *Dachetola*, are also allo- or parapatrically distributed (Hall 2001).

The following collection acronyms are used throughout the text: BMNH—The Natural History Museum, London, UK; JHKW—Collection of Jason P. W. Hall & Keith R. Willmott, Washington, DC, USA; USNM—National Museum of Natural History, Smithsonian Institution, Washington, DC, USA.

REVIEW OF *METACHARIS SYLOES* GROUP

Metacharis syloes Hewitson 1877
(Figs. 1A, B; 2A; 3A; 4)

Metacharis syloes Hewitson 1877: 96. Type locality: "Gima", E. Ecuador. Syntype female BMNH [examined].

Identification and taxonomy.—Typical forewing length: male 24 mm; female 23 mm. Although the male of *M. syloes* is virtually indistinguishable from that of *M. fergusi* on the basis of wing pattern, *M. syloes* actually appears to be sister to the allopatric west Andean clade of *M. fergusi* + *M. smalli* (both described below). Male *M. syloes* differs externally from male *M. fergusi* only by having a prominently distally displaced upper element to the black postdiscal spot in cell Cu_2 on both wings (even more apparent in females), and generally more prominent paler submarginal blue on both ventral wings. However, on the basis of examining two dissections of each species, the male genitalia of *M. syloes* differ obviously from those of *M. fergusi* (and *M. smalli*) by having a lower valve process that is just shorter instead of considerably longer than the pedicel, and an outer upper valve process that is just longer instead of very considerably longer than the pedicel (the inner upper valve process is also proportionately shorter), only weakly instead of very prominently bent downwards medially, and lacks a small spine-tipped protrusion at its inner middle.

Female *M. syloes* differs externally from females of *M. fergusi* and *M. smalli* by having a more uniform, darker dorsal surface, and a ventral surface that is entirely brown, except for some submarginal yellow spots, instead of various shades of yellow throughout. The female genitalia of *M. syloes* differ from those of *M. fergusi* and *M. smalli* by having an ostium bursae that is broader, and has a square instead of triangular posterior tip and more anteriorly extensive ventral sclerotization, and a posterior exit to the ductus bursae that is only

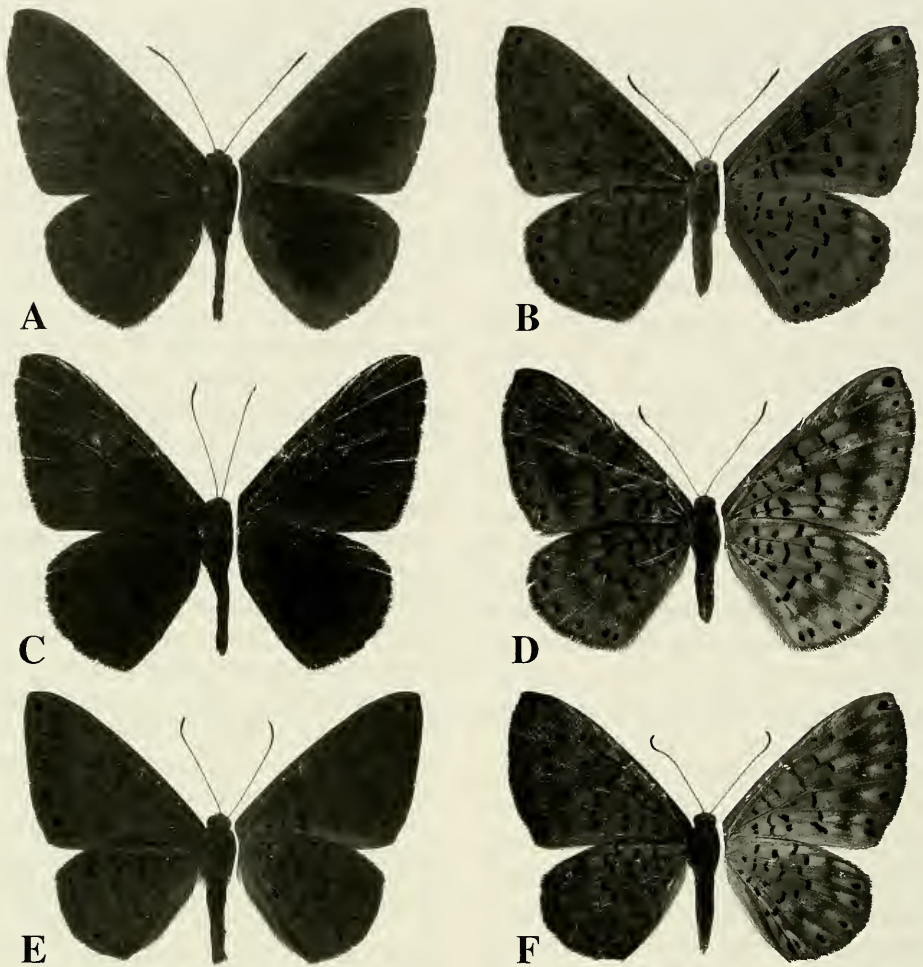


Fig. 1. *Metacharis* adults (dorsal surface on left, ventral surface on right). A, ♂ *M. syloes*, La Bonita, E. Ecuador (JHKW). B, ♀ *M. syloes*, Río Negro, E. Colombia (USNM). C, Paratype ♂ *M. fergusi*, Río Chuchuví, W. Ecuador (JHKW). D, Holotype ♀ *M. fergusi*, Alluriquín, W. Ecuador (USNM). E, Holotype ♂ *M. smalli*, Cerro Campana, C. Panama (USNM). F, Paratype ♀ *M. smalli*, Cerro Campana, C. Panama (USNM).

slightly instead of very prominently displaced to the right.

Note that the type locality for *M. syloes* is inaccurate. Gima is a small, remote village in southeastern Ecuador, lying at an elevation of about 3,000 m, that Clarence Buckley apparently used as a base of operations. However, the material that he amassed in this region, and sent to Hewitson for description (1877), was clearly collected between 1,000 and 2,000 m, presumably on the trail between Gima and the lowland town of Gualaquiza.

Biology.—This species is uncommon in montane forest habitats from 950 to 1,550 m. In Ecuador, males were encountered perching as solitary individuals or in small groups along streams and sun-dappled forest paths across the hillsides above them, in the early morning and then again in the afternoon from 1330 to 1530 h. They made rapid circling sorties before returning to perch on the same clump of bushes from 2 to 4 m above the ground, landing on top of and beneath leaves with their wings outspread. During the late afternoon, their dark

coloration and erratic flight-path make them difficult to track in the air. The rarer females were found flying along forest trails and edges throughout the middle of the day.

Distribution.—*Metacharis syloes* ranges from northern Venezuela along the eastern slope of the Andes to Bolivia (see Fig. 4).

***Metacharis fergusi* Hall, new species**

(Figs. 1C, D; 2B; 3B; 4)

Description.—Male: Forewing length 22 mm. Forewing elongate, costal and distal margins approximately straight; hindwing rounded, with slightly pointed apex and tornus. *Dorsal surface*: Ground color of both wings dark brown; four black marks in discal cell of both wings, one at base of cell Cu_1 , and three toward base of cell Cu_2 (distal-most mark on forewing medially divided), two additional black marks toward base of cell $Sc+R_1$ on hindwing; a disjointed black postdiscal band on both wings extends from vein 2A to costa, and is distally displaced at vein Cu_1 and again at vein M_1 , especially on forewing; black submarginal spots on both wings surrounded by broad and indistinct area of russet brown scaling, with semicircles of dark brown immediately proximally, and 3 mm long intervening silver stripes along veins between tornus and apex; forewing fringe brown except for white scaling in cell R_{4+5} , and hindwing fringe brown except for white scaling in cell M_1 . *Ventral surface*: Ground color of both wings iridescent dark purple, with a narrow area of paler, non-iridescent purple at distal margin of forewing and distal and anal margins of hindwing, and gray scaling along anal margin of forewing; black markings from dorsal surface largely obscured and prominently visible only at base of both wings and in distal half of hindwing, distal vein-ending silver stripes absent.

Head: Labial palpi dark brown; eyes brown, surrounding scaling dark brown; frons dark brown, becoming paler ventrally; antennal segments black with white scaling at base, clubs black.

Body: Dorsal and ventral surface of tho-

rax and abdomen dark brown; tegula dark brown; all legs dark brown.

Genitalia (Fig. 2B): Uncus short and rectangular, with a diagonal margin along ventral posterior corner; falces of average size and shape for family; small, deep, semicircular notch in anterior margin of tegumen; narrow and ribbon-like vinculum extends dorsally over anterior portion of tegumen, saccus absent; valvae consist of a narrow and curved basal ribbon, connected ventrally to a long, straight and narrow lower process, and dorsally to a medial, posteriorly elongate and triangular transtilla flanked laterally by two more processes, the inner process long, straight, narrow and tipped with short stout spines, and the outer process slightly longer and considerably broader than the inner process, prominently bent downwards medially and slightly inward overall, and with inwardly pointing spines at its tip and on a small medial process (which variably extends dorsally to nearly inwardly horizontal); aedeagus long, narrow and convex, with a tapering tip that opens to right, and a base that has soft tissue exiting directly anteriorly, cornuti absent; pedicel extends from near base of aedeagus to form a posteriorly elongate, smooth "rod" that is encircled by sclerotized tissue around distal fifth only, and is slightly upturned at tip, which is weakly bifurcate in ventral view.

Female: Differs from male as follows: Forewing length 21 mm. Forewing distal margin convex; hindwing more rounded. *Dorsal surface*: Ground color of both wings brown, with a darker brown submarginal area, and a continuous, bright russet brown marginal band. *Ventral surface*: Ground color of both wings dark yellow, with an uneven, darker, tan colored submarginal area; all black spotting on both wings prominent, submarginal spots surrounded by large yellow rectangles.

Head: Labial palpi dirty white; frons brown in dorsal half, dirty white in ventral half.

Body: Dorsal surface of thorax and ab-

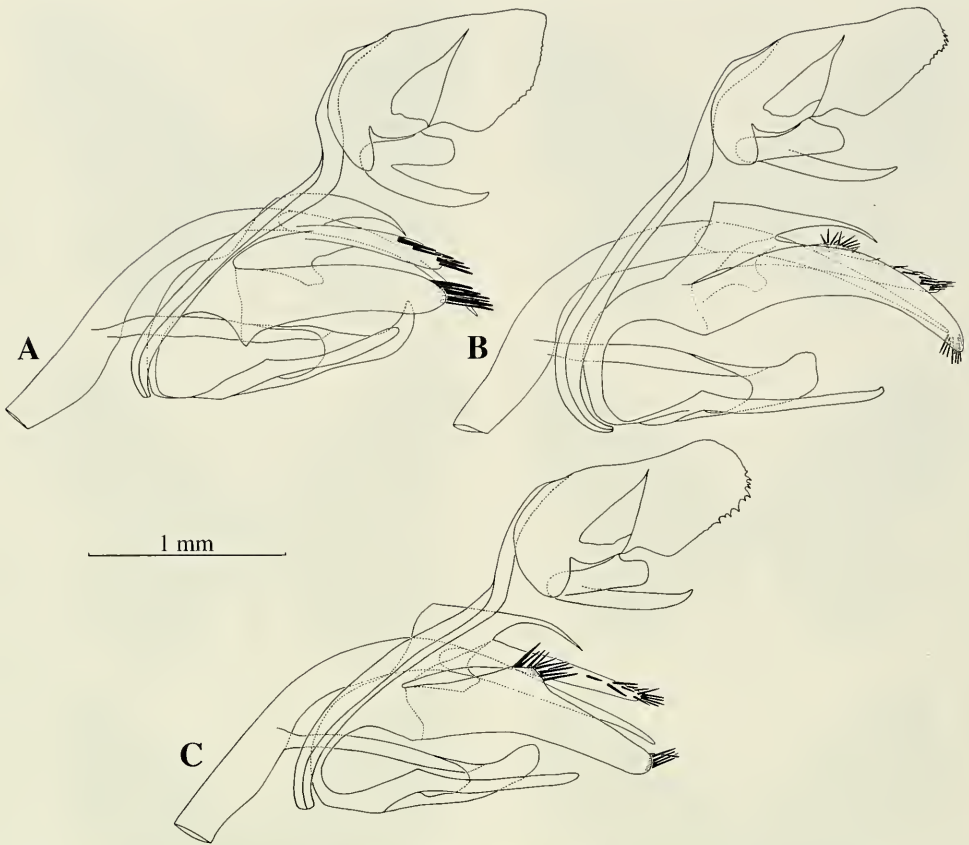


Fig. 2. *Metacharis* male genitalia in lateral view. A, *M. syloes*. B, *M. fergusi*. C, *M. smalli*.

domen pale brown, ventral surface dirty white; tegula pale brown; all legs dirty white.

Genitalia (Fig. 3B): Corpus bursae approximately round, signa short spine-like invaginations with rounded tips; membranous ductus bursae exits to right side of ostium bursae, membranous ductus seminalis exits ductus bursae ventrally, immediately before ostium bursae; ostium bursae consists of a narrow, detached, sclerotized band along anterior margin of last sternite, and a hollow, posteriorly projecting, trapezoid-shaped sclerotized structure whose base only is attached to body.

Type material.—Holotype ♀, ECUADOR: *Pichincha*, nr. Alluriquín, 750 m, 28 Aug (S. S. Nicolay) (USNM).

Paratypes: ECUADOR: 1 ♂: *Esmeraldas*, Río Piguambí, km. 7.5 Lita-San Lor-

enzo rd., 0°52.42'N, 78°29.55'W, 800 m, 19 June (J. P. W. Hall) (JHKW). 1 ♂: *Esmeraldas*, Río Chuchuví, km. 12.5 Lita-San Lorenzo rd., 0°53.01'N, 78°30.90'W, 900 m (I. Aldas) (JHKW). 1 ♀: *Carchi*, nr. Lita, ridge to east of Río Baboso, 950 m, 26 Aug (K. R. Willmott) (JHKW).

Etymology.—This species is named for my brother Fergus Monahan Hall.

Diagnosis.—The male of *M. fergusi* is very similar to that of *M. syloes*, and the female is very similar to that of *M. smalli*, from which species it is distinguished in those species accounts. By the shared possession of male genitalia with a small, spine covered protrusion at the inner middle of the outer upper valve process, a unique character within *Metacharis*, *M. fergusi* can be placed as the sister species to *M. smalli*.

Biology.—This uncommon species is

confined to premontane forest habitats from 750 m to at least 950 m. In Ecuador, solitary males were encountered perching both on low secondary growth vegetation along streamsides during the mid to late afternoon, and 5 m above the ground in a hilltop forest lightgap from 1145 to 1530 h. They perched on top of and beneath leaves with their wings spread open. A female was collected flying at the forest edge along a ridge-top during mid-day.

Distribution.—*Metacharis fergusi* is currently known only from the west Andean slope of Ecuador, but is presumably endemic to the Chocó of western Ecuador and western Colombia (see Fig. 4). It is replaced in the mountains of central and eastern Panama by *M. smalli*, and along the eastern Andes by *M. syloes*.

***Metacharis smalli* Hall, new species**

(Figs. 1E, F; 2C; 3C; 4)

Description.—Male: Forewing length 21 mm. Forewing elongate, costal and distal margins approximately straight; hindwing rounded, with slightly pointed apex and torus. *Dorsal surface:* Same as *M. fergusi*, except ground color slightly paler brown. *Ventral surface:* Differs from dorsal surface as follows: Ground color of both wings rich russet brown, with gray scaling along anal margins; black markings on forewing slightly fainter, contrasted scaling surrounding all submarginal spots except that in cell R_{4+5} on forewing, and intervening silver stripes, absent.

Head: Labial palpi brown; eyes brown, surrounding scaling brown; frons brown, becoming paler ventrally; antennal segments black with white scaling at base, clubs black, tips orange-brown.

Body: Dorsal surface of thorax and abdomen dark brown, ventral surface paler brown; tegula brown; all legs brown.

Genitalia (Fig. 2C): Same as *M. fergusi*, except valve processes slightly shorter.

Female: Differs from male as follows: Forewing length 20 mm. Forewing distal

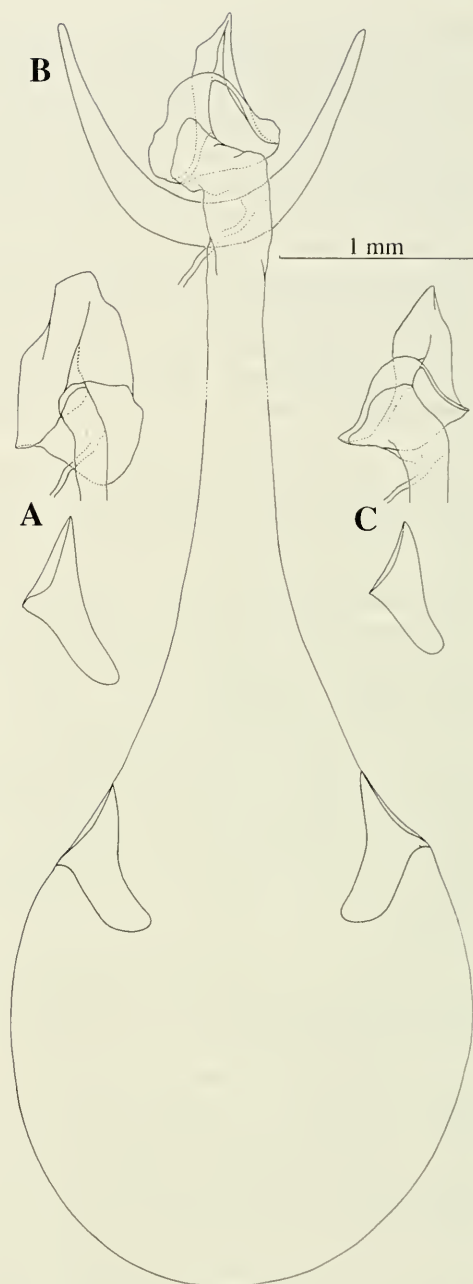


Fig. 3. *Metacharis* female genitalia in dorsal view, either in their entirety (B), or with signum and ostium bursae only (A and C). A, *M. syloes*. B, *M. fergusi*. C, *M. smalli*.

margin convex; hindwing more rounded. *Dorsal surface*: Ground color of both wings a pale, slightly rufous brown, with an uneven, darker brown submarginal area; russet brown along distal margin of both wings slightly paler and more prominent. *Ventral surface*: Ground color of both wings dark yellow, with an uneven, darker, tan colored submarginal area; black submarginal spots prominent on both wings and surrounded by an elongate yellow area.

Head: Labial palpi dirty white; frons brown in dorsal half, dirty white in ventral half.

Body: Dorsal surface of thorax and abdomen pale brown, ventral surface dirty white; tegula pale brown; all legs dirty white.

Genitalia (Fig. 3C): Same as *M. fergusi*.

Type material.—Holotype ♂, PANAMA: Panamá, Cerro Campana, 2,500 ft, 3 Sept (G. B. Small) (USNM).

Paratypes: PANAMA: Panamá, Cerro Campana, 2,500 ft, 1 ♂: 15 July; 1 ♀: 29 July (G. B. Small) (USNM). Panamá, Altos de Pacora, 2,000 ft, 1 ♂: 29 Mar; 1 ♂: 18 Mar (G. B. Small) (USNM). 1 ♂: Darién, Caña, 750 m, 26 June (G. B. Small) (USNM).

Etymology.—As Gordon Small collected the entire type series, it seems only fitting that this species should be named after him.

Diagnosis.—The male of *M. smalli* is readily distinguished from that of the sister species *M. fergusi* by having a rich russet brown instead of iridescent purple ventral surface. Ventral wing coloration in *Metacharis* is clearly evolutionarily labile, as evidenced by the multiple gain or loss (the ancestral state is not known with any degree of certainty) of ventral iridescence in the genus, a character that recurs in every species group. The apparently parapatrically distributed, Amazonian sister species pair of *M. regalis* and *M. nigrella* also primarily differ from each other by having russet brown and iridescent purple ventral surfaces, respectively. Having examined the genitalia of two males of both *M. smalli* and



Fig. 4. Topographic map of northwestern South America indicating the geographic distributions of *Metacharis syloes* group species.

M. fergusi, the only consistent difference seems to be slightly shorter valve processes in *M. smalli*.

The females of *M. smalli* and *M. fergusi* are very similar, but *M. smalli* has a more uniformly paler brown dorsal surface, less contrasting shades of yellow on the ventral surface, and submarginal yellow ocelli on both ventral wings that are clearly separated instead of formed into a continuous band. This last difference is also present on the dorsal surface, but is less pronounced. There are no significant differences in the female genitalia of the two species.

Biology.—Nothing is known about the biology of this species, except that it is confined to premontane forest habitats from about 650 m to at least 800 m.

Distribution.—*Metacharis smalli* appears to be endemic to the mountains of central and eastern Panama (see Fig. 4). As the re-

mote Serrania de Darién and Cordillera de Quia straddle the Panama-Colombia border, it should also eventually be found in the extreme north of Chocó province, north-western Colombia. It is replaced by *M. fergusi* along the western slope of the northern Andes.

NOTE ON THE STATUS OF *METACHARIS*
UMBRATA

Stichel proposed (1929) the name *umbrata* as a form of *Metacharis cuparina*, based on a single female from Río Micay, western Colombia (holotype examined in the Zoologische Museum für Naturkunde, Berlin, Germany), and the name was recently synonymized with *M. victrix* by Callaghan and Lamas (in press). This is essentially an identical nomenclatural case to *Sarota lasciva* Stichel (Riodininae: Helicopini) (resolved in Hall 1998), with the content of Stichel's 1929 description not "unambiguously reveal[ing] that the name was proposed for an infrasubspecific entity" (Article 45.6.4, ICZN 1999). I therefore regard *umbrata* as an available name and raise it to the rank of species. It is the sister species of *M. victrix*, and is macrosympatric with it from Costa Rica to western Ecuador. However, the two species appear not to fly in the same place, with *M. umbrata* restricted to wet forest and *M. victrix* confined to drier forest habitats (Hall and Willmott, unpublished data). Their male genitalia, at least, do not differ significantly, but the male of *M. umbrata* is readily distinguished from that of *M. victrix* by its iridescent purple, instead of rufous brown, dorsal surface, and the female is best separated by the broad blackish area in its forewing apex. DeVries (1997) figured a male of *M. umbrata* and gave it that name in his text based on information provided by myself, but I was not credited for this novel identification and the name on his addenda plate was unfortunately misspelled "onorata."

ACKNOWLEDGMENTS

I thank Phillip Ackery for access to, and Keith Willmott for subsequently relaying

certain specimen data from, the BMNH riodinid collections; Keith Willmott for allowing me to use the base map in Fig. 4; The National Geographic Society (Research and Exploration Grant # 5751-96) and The National Science Foundation (Biodiversity Surveys & Inventories Grant # 0103746) for financial support; Gerardo Lamas for helpful comments on the manuscript; and the Museo Nacional de Ciencias Naturales and the Ministerio del Ambiente (formerly INEFAN), in Quito, for arranging the necessary permits for research in Ecuador.

LITERATURE CITED

- Bates, H. W. 1868. A catalogue of Erycinidae, a family of diurnal Lepidoptera. *Journal of the Linnean Society (London) (Zoology)* 9: 373-459.
- Bridges, C. A. 1994. Catalogue of the Family-Group, Genus-Group and Species-Group Names of the Riodinidae and Lycaenidae (Lepidoptera) of the World. C. Bridges, Urbana, Illinois, 1,113 pp.
- Callaghan, C. J. 1995. Les types des Riodinidae du Muséum national d'Histoire naturelle de Paris (Lepidoptera, Rhopalocera). *Bulletin de la Société Entomologique de France* 100(2): 153-155.
- Callaghan, C. J. and G. Lamas. In press. Riodinidae. In Lamas, G., ed. Checklist: Part 4A. Hesperioidea—Papilionoidea. In Heppner, J. B., ed. Atlas of Neotropical Lepidoptera. Scientific Publishers, Gainesville.
- d'Abrera, B. 1994. Butterflies of the Neotropical Region, Part VI. Riodinidae. Hill House, Victoria, Australia. Pp. 880-1096.
- DeVries, P. J. 1997. The Butterflies of Costa Rica and Their Natural History, Vol. II. Riodinidae. Princeton University Press, Princeton, 288 pp.
- Hall, J. P. W. 1998. A review of the genus *Sarota* (Lepidoptera: Riodinidae), pp. 1-21. In Hall, J. P. W., ed. A Contribution to Riodinid Systematics. Tropical Lepidoptera, 9(2), Supplement 1.
- . 2001. A revision of the new riodinid butterfly genus *Dachetola* (Lepidoptera: Riodinidae: Riodinini). *Journal of the New York Entomological Society* 109(2): 183-195.
- Hall, J. P. W. and D. J. Harvey. 2002. A survey of androconial organs in the Riodinidae (Lepidoptera). *Zoological Journal of the Linnean Society* 136: 171-197.
- Hewitson, W. C. 1877. Equatorial Lepidoptera Collected by Mr. Buckley. 5: 81-96. J. Van Voorst, London.
- International Commission on Zoological Nomenclature. 1999. International Code of Zoological Nomenclature. Fourth Edition. International Trust for Zoological Nomenclature, London, 306 pp.

- Rebillard, P. 1958. Contribution a la connaissance des Riodinidae Sud-Américains. *Mémoires du Muséum d'Histoire Naturelle (A)* 15: 135-216.
- Stichel, H. F. E. J. 1910-11. Lepidoptera Rhopalocera. Fam. Riodinidae, pp. 1-452. *In* Wytzman, J., ed. *Genera Insectorum* 112. J. Wytzman, Brussels.
- . 1929. Beiträge zur Kenntnis der Riodinidenfauna Südamerikas X. (Lep. Rhop.). *Deutsche Entomologische Zeitschrift* 1929(3): 199-208.
- . 1930-31. Riodinidae, pp. 1-795. *In* Strand, E., ed. *Lepidopterorum Catalogus* 38-41. W. Junk, Berlin.